



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,511	04/03/2006	Raphael Salot	127579	6980
25944	7590	05/28/2009	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				CULLEN, SEAN P
ART UNIT		PAPER NUMBER		
4133				
		MAIL DATE		DELIVERY MODE
		05/28/2009		PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,511	SALOT ET AL.	
	Examiner	Art Unit	
	Sean P. Cullen	4133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 24-46 is/are pending in the application.
 - 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 24-46 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 03 April 2006 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ . |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/03/2006</u> . | 6) <input type="checkbox"/> Other: ____ . |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 40 and 41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 40, the claim as recited is dependent on claim 34. Claim 34 requires the first electrode comprising $A_{x1}T_{y1}[XY_1Y_2Y_3Y_4]_{z1}B_{w1}$ type and the electrolyte comprising $[XY_1Y_2Y_3Y_4]$ and $[X'Y'_1Y'_2Y'_3Y'_4]$ type. Claim 34 does not require the groups $[XY_1Y_2Y_3Y_4]$ and $[X'Y'_1Y'_2Y'_3Y'_4]$ to be identical, but they can be identical. Therefore, it is unclear how the concentrations of the constituents of the first electrode, $A_{x1}T_{y1}[XY_1Y_2Y_3Y_4]_{z1}B_{w1}$, can vary from 0 to 1 from the electrolyte to the first electrode while the constituents of the electrolyte, $[XY_1Y_2Y_3Y_4]$ vary from 1 to 0 from the electrolyte to the first electrode, i.e. the concentration of $[XY_1Y_2Y_3Y_4]$ must be 1 and 0 at the first electrode and the electrolyte.

Regarding claim 41, the claim as recited is dependent on claim 40 and is thus indefinite. Claim 40 further requires first electrode comprising $A_{x2}T'_{y2}[X'Y'_1Y'_2Y'_3Y'_4]_{z2}B'_{w2}$ type and the electrolyte comprising $[XY_1Y_2Y_3Y_4]$ and $[X'Y'_1Y'_2Y'_3Y'_4]$ type. Claim 40 does not require the groups $[XY_1Y_2Y_3Y_4]$ and $[X'Y'_1Y'_2Y'_3Y'_4]$ to be identical but they can be identical. Therefore, it is unclear how the concentrations of the constituents of the second electrode, $A_{x2}T'_{y2}[X'Y'_1Y'_2Y'_3Y'_4]_{z2}B'_{w2}$, can vary from 0 to 1 from the electrolyte to the second electrode while the constituents of the electrolyte, $[X'Y'_1Y'_2Y'_3Y'_4]$ vary from 1 to 0 from the

electrolyte to the first electrode, i.e. the concentration of $[X'Y'_1Y'_2Y'_3Y'_4]$ must be 1 and 0 at the second electrode and the electrolyte.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 4133

6. Claims 24-39 rejected under 35 U.S.C. 103(a) as being unpatentable over Bates et al. (U.S. 5,597,660) in view of Barker et al. (U.S. 2003/0027049).

Regarding claim 24, Bates et al. discloses a microbattery comprising:

- in the form of thin layers (abstract), at least first (28) and second electrodes (24) between which a solid electrolyte (24) is disposed,
- the electrolyte comprises grouping of the $[XY_1Y_2Y_3Y_4]$ type (C3/L45-48)
- where X is located in a tetrahedron whose peaks are respectively formed by the chemical elements Y_1 , Y_2 , Y_3 and Y_4 , the chemical element X being selected from the group consisting of **phosphorus**, boron, silicon, sulphur, molybdenum, vanadium and germanium and the chemical elements Y_1 , Y_2 , Y_3 and Y_4 being selected from the group consisting of sulphur, **oxygen**, fluorine and chlorine (Li_3PO_4 , C3/L45-48).

Bates et al. does not explicitly disclose a microbattery:

- wherein the first electrode and electrolyte both comprise at least one common grouping of the $[XY_1Y_2Y_3Y_4]$ type

Barker et al. disclose electrode comprising a grouping of the $[XY_1Y_2Y_3Y_4]$ type where X is located in a tetrahedron whose peaks are respectively formed by the chemical elements Y_1 , Y_2 , Y_3 and Y_4 , the chemical element X being selected from the group consisting of **phosphorus**, boron, silicon, sulphur, molybdenum, vanadium and germanium and the chemical elements Y_1 , Y_2 , Y_3 and Y_4 being selected from the group consisting of sulphur, **oxygen**, fluorine and chlorine for a battery ($Li_aM_b(PO_4)Z_d$, [0045]). Barker et al. teaches the use of the electrode active material to afford benefits, such as, increase capacity, enhanced cycling capability, enhanced

reversibility and reduced costs [0021]. Bates et al. do not expressly disclose a first electrode and electrolyte comprising at least one common grouping of the $[XY_1Y_2Y_3Y_4]$ type, but allow for modifications to be made to the preferred embodiment (C6/L37-42) in order to enhance the cycling characteristics of the battery (C4/L9-12). Bates et al. and Barker et al. are analogous art because they are direct to the improved performance of lithium ion secondary batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the first electrode of Barker et al. to enhance the cycling capability.

Regarding claim 25, modified Bates et al. discloses all claim limitations set forth above as applied to claim 24 and further discloses:

- wherein the chemical elements Y_1 , Y_2 , Y_3 and Y_4 are identical (Li_3PO_4 , C3/L45-48).

Regarding claim 26, modified Bates et al. discloses all claim limitations set forth above as applied to claim 24 and further discloses:

- wherein at least one chemical element selected from the group consisting of Y_1 , Y_2 , Y_3 and Y_4 forms a peak common to two tetrahedra (C4/L19-42).

Regarding claim 27, modified Bates et al. discloses all claim limitations set forth above as applied to claim 24 and further discloses:

- wherein the electrolyte (26) comprises nitrogen (C3/L59-62).

Regarding claim 28, modified Bates et al. discloses all claim limitations set forth above as applied to claim 24 and further discloses:

- wherein the electrolyte (26) comprises an alkaline metal ion A selected from the group consisting of **lithium** and sodium (Li₃PO₄, C3/L45-48).

Regarding claim 29, modified Bates et al. discloses all claim limitations set forth above as applied to claim 28, but does not explicitly disclose a microbattery:

- wherein the first electrode comprises the alkaline metal ion A,
- a mixture of metallic ions T comprising at least one transition metal ion selected from the group consisting of titanium, vanadium, chromium, cobalt, nickel, manganese, iron, copper, niobium, molybdenum and tungsten and
- a chemical element B selected from the group consisting of sulphur, oxygen, fluorine and chlorine, so as to form a compound of A_{x1}T_{y1}[XY₁Y₂Y₃Y₄]_{z1}B_{w1} type with the [XY₁Y₂Y₃Y₄] grouping, with x₁ and w₁ ≥ 0 and y₁ and z₁ > 0,
- a chemical element E selected from the group consisting of metals and carbon being dispersed in the compound.

Barker et al. further discloses, in a battery, a first electrode comprises the alkaline metal ion A selected from the group consisting of **lithium** and sodium, a mixture of metallic ions T comprising at least one transition metal ion selected from the group consisting of titanium, vanadium, chromium, cobalt, nickel, manganese, **iron**, copper, niobium, molybdenum and tungsten and a chemical element B selected from the group consisting of sulphur, oxygen, fluorine and **chlorine**, so as to form a compound of A_{x1}T_{y1}[XY₁Y₂Y₃Y₄]_{z1}B_{w1} type with the [XY₁Y₂Y₃Y₄] grouping, with x₁ and w₁ ≥ 0 and y₁ and z₁ > 0 (Li₂FePO₄Cl, [0086]) and further comprising a chemical element E selected from the group consisting of metals and **carbon** being dispersed in the compound (carbon black, [0147]). Therefore, it would have been obvious to one

Art Unit: 4133

of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the first electrode of Barker et al. to enhance the cycling capability.

Regarding claim 30, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 29 and further discloses:

- wherein the second electrode (24) comprises at least one grouping of the $[X'Y'_1Y'_2Y'_3Y'_4]$ type, where X' is located in a tetrahedron whose peaks are respectively formed by the chemical elements Y'_1, Y'_2, Y'_3 and Y'_4, (C3/L42-45)
- the chemical element X' being selected from the group consisting of phosphorus, boron, silicon, sulphur, molybdenum, **vanadium** and germanium and (VO_X, C3/L42-45)
- the chemical elements Y'_1, Y'_2, Y'_3 and Y'_4 being selected from the group consisting of sulphur, **oxygen**, fluorine and chlorine (VO_X, C3/L42-45).

Regarding claim 31, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 30, but does not expressly disclose a microbattery:

- wherein the second electrode comprises the alkaline metal ion A,
- a mixture of metallic ions T' comprising at least one transition metal ion selected from the group consisting of titanium, vanadium, chromium, cobalt, nickel, manganese, iron, copper, niobium, molybdenum and tungsten and
- a chemical element B' selected from the group consisting of sulphur, oxygen, fluorine and chlorine, so as to form a compound of $A_{x_2}T'_{y_2}[X'Y'_1Y'_2Y'_3Y'_4]_{z_2}B'w_2$ type, with the $[X'Y'_1Y'_2Y'_3Y'_4]$ grouping, with x_2 and $w_2 \geq 0$ and y_2 and $z_2 > 0$,

- a chemical element E' selected from the group consisting of metals and carbon being dispersed in the compound so that the first and second electrodes have different intercalation potentials of the alkaline metal ion.

Barker et al. further discloses, in a battery, a second electrode comprises the alkaline metal ion A selected from the group consisting of **lithium** and sodium, a mixture of metallic ions T' comprising at least one transition metal ion selected from the group consisting of titanium, vanadium, chromium, **cobalt**, nickel, manganese, iron, copper, niobium, molybdenum and tungsten and a chemical element B' selected from the group consisting of sulphur, oxygen, **fluorine** and chlorine, so as to form a compound of $A_{x_2}T'y_2[X'Y'_1Y'_2Y'_3Y'_4]_{z_2}B'w_2$ type, with the $[X'Y'_1Y'_2Y'_3Y'_4]$ grouping, with x_2 and $w_2 \geq 0$ and y_2 and $z_2 > 0$, ($Li_3CoPO_4F_2$, [0086]) a chemical element E' selected from the group consisting of metals and **carbon** being dispersed in the compound (carbon black, [0142]) Although Barker et al. does not explicitly disclose that the first and second electrodes have different intercalation potentials of the alkaline metal ion. The use of $Li_3CoPO_4F_2$ ($LiCoPO_4$) as the cathode and Li_2FePO_4Cl ($LiFePO_4$) as the anode are taught [0086]. “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. Barker et al. teaches use of $LiCoPO_4$ as the cathode and $LiFePO_4$ as the anode [0086]; therefore, they would have the same properties as the battery described in the instant application (P9/L1-4), specifically different intercalation potentials. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, it would have been obvious

to one of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the second electrode of Barker et al. to enhance the cycling capability.

Regarding claim 32, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 31, but does not expressly disclose a microbattery:

- wherein T and T' are identical.

Barker et al. further discloses wherein T and T' are identical ($\text{Li}_2\text{Fe}(\text{PO}_3\text{F}_2)\text{F}$ and $\text{Li}_2\text{FePO}_4\text{Cl}$, [0086]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the first and second electrode of Barker et al. to enhance the cycling capability.

Regarding claim 33, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 31 and further discloses:

- wherein E and E' are identical (Barker et al., carbon black, [0142] and [0147]).

Regarding claim 34, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 31 and further discloses:

- wherein the electrolyte comprises the groupings $[\text{XY}_1\text{Y}_2\text{Y}_3\text{Y}_4]$ and $[\text{X}'\text{Y}'_1\text{Y}'_2\text{Y}'_3\text{Y}'_4]$ (Bates et al., Li_3PO_4 , C3/L45-48 and Barker et al., $\text{Li}_2\text{FePO}_4\text{Cl}$, [0086]; $\text{Li}_3\text{CoPO}_4\text{F}_2$, [0086]).

Regarding claim 35, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 31 and further discloses:

- wherein the elements X' , Y'_1 , Y'_2 , Y'_3 and Y'_4 are respectively identical to the elements X , Y_1 , Y_2 , Y_3 and Y_4 (Bates et al., Li_3PO_4 , C3/L45-48 and Barker et al., $\text{Li}_2\text{FePO}_4\text{Cl}$, [0086]; $\text{Li}_3\text{CoPO}_4\text{F}_2$, [0086]).

Regarding claim 36, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 31 and further discloses:

- wherein the second electrode is formed by the alkaline metal or an alloy of the alkaline metal (Barker et al., Li₃CoPO₄F₂, [0086]).

Regarding claim 37, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 31 and further discloses:

- wherein the second electrode is formed by a material able to be alloyed with the alkaline metal (Barker et al., Li₃CoPO₄F₂, [0086]).

Regarding claim 38, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 36, but does not expressly disclose a microbattery:

- wherein the material able to be alloyed with the alkaline metal is made of silicon, carbon or tin.

Barker et al. further discloses a second electrode wherein the material able to be alloyed with the alkaline metal is made of silicon, carbon or tin (Na_{5.25}FeMn(SiO₄)₂(PO₄)Br_{0.25}, [0086]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the second electrode of Barker et al. to enhance the cycling capability.

Regarding claim 39, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 29, but does not expressly disclose a microbattery:

- wherein the second electrode is formed by a mixed chalcogenide comprising a transition metal.

Barker et al. further discloses a second electrode formed by a mixed chalcogenide comprising a transition metal ($\text{Li}_4\text{Fe}(\text{GeO}_{3.55}\text{F}_{0.39})_3\text{F}$, [0086]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the second electrode of Barker et al. to enhance the cycling capability.

7. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bates et al. (U.S. 5,597,660) in view of Barker et al. (U.S. 2003/0027049) as applied to claims 24-39 above, and further in view of Hashimoto et al. (U.S. 6,287,716).

Regarding claim 40, further modified Bates et al. discloses all claim limitations set forth above as applied to claims 24-39, but does not explicitly disclose a microbattery:

- wherein a first intermediate thin layer comprising the respective constituents of the first electrode and of the electrolyte is arranged between the first electrode and the electrolyte,
- the concentrations of the constituents of the first electrode and of constituents of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the first electrode.

Hashimoto et al. discloses, in a fuel cell, wherein a first intermediate thin layer (see intermediate layer, C4/L27-40) comprising the respective constituents of the first electrode (see air electrode, C4/L27-40) and of the electrolyte (see solid electrolyte, C4/L27-40) is arranged between the first electrode and the electrolyte (C8/L38-45). Hashimoto further discloses the concentrations of the constituents of the first electrode and of constituents of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the first electrode

(C7/L58-64) in order for the composition between each interface to change continuously (abstract). Bates et al., Barker et al. and Hashimoto et al. are analogous art because they are directed towards the use of solid electrolytes and electrodes for power generation using electrochemical reactions. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the first intermediate layer of Hashimoto et al. between the first electrode of Barker et al. and the electrode in the battery of Bates et al. in order for the composition between each interface to change continuously.

Regarding claim 41, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 40, but does not explicitly disclose a microbattery:

- wherein a second intermediate thin layer comprising the respective constituents of the second electrode and of the electrolyte is arranged between the second electrode and the electrolyte,
- the concentrations of the constituents of the second electrode and of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the second electrode.

Hashimoto et al. does not explicitly disclose a second intermediate layer, but as detailed above Hashimoto et al. discloses an intermediate layer comprising respective constituents of an electrode and of a electrolyte (C8/L38-45) arranged between an electrode and electrolyte (C4/L27-40). Hashimoto further discloses the concentrations of the constituents of the electrode and of constituents of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the electrode (C7/L58-64) in order for the composition between each interface to change continuously (abstract). Therefore, it would have been obvious to one of ordinary skill in

the art at the time of the invention to use the intermediate layer of Hashimoto et al. between the second electrode of Barker et al. and the electrode in the battery of Bates et al in order for the composition between each interface to change continuously.

8. Claims 42 and 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bates et al. (U.S. 5,597,660) in view of Barker et al. (U.S. 2003/0027049) as applied to claims 24-39 above, and further in view of Shibano et al (U.S. 2004/0096745).

Regarding 42, further modified Bates et al. discloses all claim limitations set forth above as applied to claims 24-39 and further discloses a method for production of a microbattery:

- a second thin layer forming the electrolyte by means of a second sputtering target comprising at least the grouping of $[XY_1Y_2Y_3Y_4]$ type (C3/L45-48),

Modified Bates et al. does not expressly disclose a method for production of a microbattery consisting in successively depositing on a substrate:

- a first thin layer forming the second electrode by means of a first sputtering target comprising at least the compound of $A_{x2}T'y_2[XY_1Y_2Y_3Y_4]_{z2}B'w_2$ type and the chemical element E',
- a third thin layer forming the first electrode by means of a third sputtering target comprising at least the grouping of $A_{x1}T_y[XY_1Y_2Y_3Y_4]_{z1}B_{w1}$ type and the chemical element E.

Shibano et al. discloses successively depositing on a substrate a first thin layer forming the second electrode (3, [0036]), a second thin layer forming the electrolyte (4) by means of a

second sputtering target [0037], and a third thin layer forming the first electrode by means of a third sputtering target [0038]. Although Shibano et al. does not explicitly teach the first sputtering target comprising at least the compound of $A_{x2}T_{y2}[XY_1Y_2Y_3Y_4]_{z2}B'_{w2}$ type and the chemical element E', and the third sputtering target comprising at least the grouping of $A_{x1}T_{y1}[XY_1Y_2Y_3Y_4]_{z1}B_{w1}$ type and the chemical element E, no particular limitations are placed on the material used for the first and third sputtering target. Bates et al., Barker et al. and Shibano et al. are analogous art because they are direct to the improved performance of lithium ion secondary batteries. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the battery of Bates et al. with the first electrode of Barker et al. to enhance the cycling capability using the method of Shibano et al.

Regarding claim 45, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 42 and further discloses:

- wherein the electrolyte is deposited in the presence of gaseous nitrogen (C3/L45-48).

Regarding claim 46, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 42 and further discloses:

- wherein first (18) and second current collectors (20) are deposited on the substrate (22), by cathode sputtering (C3/L34-42), before deposition of the second electrode (24).

9. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bates et al. (U.S. 5,597,660) in view of Barker et al. (U.S. 2003/0027049) in further view of Shibano et

al. (U.S. 2004/0096745) as applied to claims 42 and 45-46 above, and further in view of Lin et al. (U.S. 2005/0280118).

Regarding claim 43, further modified Bates et al. discloses all claim limitations set forth above as applied to claims 42 and 45-56, but does not explicitly disclose a method for production of a microbattery:

- wherein a first intermediate thin layer is deposited on the second electrode by means of the first and second sputtering targets before deposition of the electrolyte.

Lin et al. discloses the means of a first and second sputtering target during deposition to achieve a concentration gradient in the layer [0062]. Lin et al. does not disclose wherein the first intermediate layer is deposited on the second electrode before the deposition of the electrolyte. Bates et al., Barker et al., Shibano et al. and Lin et al. are analogous art because they are directed to manufacture of multilayer film structure using the successive deposition of each layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the means of the first and second sputtering targets of Lin et al. for the deposition of the first intermediate layer of Shibano et al. between the second electrode of Barker et al. and electrolyte in the battery of Bates et al. in order to achieve a concentration gradient in the first intermediate layer.

Regarding claim 44, further modified Bates et al. discloses all claim limitations set forth above as applied to claim 43, but does not explicitly disclose a method for production of a microbattery:

- wherein a second intermediate thin layer is deposited on the electrolyte by means of the second and third sputtering targets before deposition of the first electrode.

Lin et al. discloses the means of a second and third sputtering target during deposition to achieve a concentration gradient in the layer [0062]. Lin et al. does not disclose wherein the second intermediate layer is deposited on the electrolyte before the deposition of the first electrode. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the means of the first and second sputtering targets of Lin et al. for the deposition of the first intermediate layer of Shibano et al. between the first electrode of Barker et al. and electrolyte in the battery of Bates et al. in order to achieve a concentration gradient in the second intermediate layer.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean P. Cullen whose telephone number is 571-270-1251. The examiner can normally be reached on Monday thru Thursday 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. P. C./
Examiner, Art Unit 4133

/Milton I. Cano/
Supervisory Patent Examiner, Art Unit 4122